



APR 19 Rec'd PCT/PTO 26 MAR 2009

PATENT  
24500-000016/US

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant(s): Valerie BOUSQUET et al. Patent No.: 7,504,321  
Application No.: 10/525,406 Group No.: 2812  
Filed: May 5, 2006 Examiner: Menz, Laura M.  
Issued: March 17, 2009  
Conf. No.: 7482  
For: MBE GROWTH OF AN ALGAN LAYER OR ALGAN  
MULTILAYER STRUCTURE

**REQUEST FOR CERTIFICATE OF CORRECTION**

Customer Service Window  
Randolph Building  
401 Dulany Street  
Alexandria, VA 22314

**Attn: Certificate of Correction Branch**

March 26, 2009

**Certificate**

APR 02 2009

**of Correction**

Sir:

Pursuant to the provisions of 37 C.F.R. § 1.322, please enter the attached Certificate of Correction.

Applicant notes that the residence of the Assignee appearing on the page 1 of U.S. Patent No. 7,504,321 is erroneously printed as "Osaki-shi (JP)". The correct residence of the Assignee should read as "Osaka-shi (JP)". Applicant respectfully submits a copy of the Notice of Recordation mailed from the U.S.P.T.O. on July 3, 2006 which notes the correct address of the Assignee.

Since the errors noted are believed to be the fault of the Applicant, we enclose herewith the \$100.00 Certificate of Correction fee. If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fee required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

03/31/2009 SSANDARA 00000011 7504321

01 FC:1811

100.00 DP

APR 02 2009

In view of the foregoing, issuance of the Certificate of Correction is respectfully requested.

Respectfully submitted,

HARNESS, DICKY & PIERCE, P.L.C.

By:   
Donald J. Daley, Reg. No. 34,313

P.O. Box 8910  
Reston, Virginia 20195  
(703) 668-8000

DJD/wwv

Enclosures: Copy of page 1 of issued patent w/ correction in red ink  
Certificate of Correction (PTO/SB/44)  
Copy of Notice of Recordation

APR 02 2009



US007504321B2

(12) **United States Patent**  
**Bousquet et al.**

(10) **Patent No.:** **US 7,504,321 B2**

(45) **Date of Patent:** **Mar. 17, 2009**

(54) **MBE GROWTH OF AN ALGAN LAYER OR  
ALGAN MULTILAYER STRUCTURE**

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

6,579,780 B2 *	6/2003	Takahashi	438/479
6,580,101 B2 *	6/2003	Yoshida	257/192
6,768,146 B2 *	7/2004	Yoshida	257/279
7,427,555 B2 *	9/2008	Haskell et al.	438/478
2001/0006840 A1 *	7/2001	Takahashi	438/483
2001/0032999 A1 *	10/2001	Yoshida	257/332
2003/0098462 A1 *	5/2003	Yoshida	257/183

(75) **Inventors:** Valerie Bousquet, Oxford (GB);  
Stewart Edward Hooper, Oxfordshire  
(GB); Jennifer Mary Barnes, Oxford  
(GB); Katherine L. Johnson, Oxford  
(GB); Jonathan Heffernan, Oxford  
(GB)

(73) **Assignee:** Sharp Kabushiki Kaisha, Osaka-shi  
(JP) *Osaka-shi*

(\*) **Notice:** Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 460 days.

(21) **Appl. No.:** 10/525,406

(22) **PCT Filed:** Aug. 18, 2003

(86) **PCT No.:** PCT/JP03/10421

§ 371 (c)(1),  
(2), (4) **Date:** May 5, 2006

(87) **PCT Pub. No.:** WO2004/019390

**PCT Pub. Date:** Mar. 4, 2004

(65) **Prior Publication Data**

US 2006/0237740 A1 Oct. 26, 2006

(30) **Foreign Application Priority Data**

Aug. 23, 2002 (GB) 0219728.3

(51) **Int. Cl.**  
**H01L 21/00** (2006.01)

(52) **U.S. Cl.** 438/478; 438/479; 438/483

(58) **Field of Classification Search** 438/478-479,  
438/483

See application file for complete search history.

(Continued)

**FOREIGN PATENT DOCUMENTS**

EP 1 061 564 A2 12/2000

(Continued)

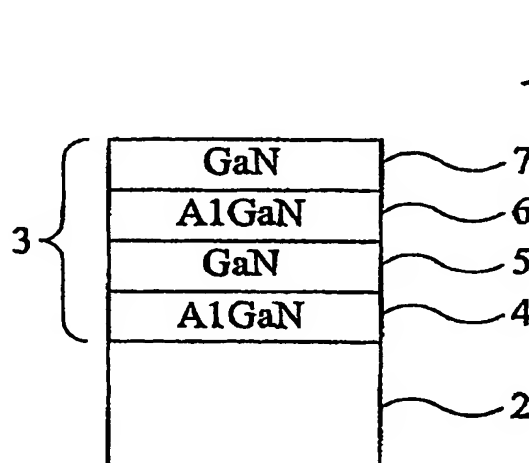
**Primary Examiner**—Laura M Menz

(74) **Attorney, Agent, or Firm**—Harness Dickey & Pierce

(57) **ABSTRACT**

A method of growing an AlGa<sub>N</sub> semiconductor layer structure by Molecular Beam Epitaxy comprises supplying ammonia, gallium and aluminum to a growth chamber thereby to grow a first (Al,Ga)<sub>N</sub> layer by MBE over a substrate disposed in the growth chamber. The first (Al,Ga)<sub>N</sub> layer has a non-zero aluminum mole fraction. Ammonia is supplied at a beam equivalent pressure of at least 1 10<sup>-4</sup> mbar, gallium is supplied at a beam equivalent pressure of at least 1 10<sup>-8</sup> mbar and aluminum is supplied at a beam equivalent pressure of at least 1 10<sup>-8</sup> mbar during the growth step. Once the first (Al,Ga)<sub>N</sub> layer has been grown, varying the supply rate of gallium and/or aluminum enables a second (Al,Ga)<sub>N</sub> layer, having a different aluminum mole fraction from the first (Al,Ga)<sub>N</sub> layer to be grown by MBE over the first (Al,Ga)<sub>N</sub> layer. This process may be repeated to grown an (Al,Ga)<sub>N</sub> multilayer structure.

**21 Claims, 4 Drawing Sheets**



APR 02 2009

**UNITED STATES PATENT AND TRADEMARK OFFICE**

**CERTIFICATE OF CORRECTION**

Page 1 of 1

**PATENT NO.** 7,504,321  
**APPLICATION NO.:** 10/525,406  
**ISSUE DATE** March 17, 2009  
**INVENTOR(S)** Valerie BOUSQUET  
Stewart Edward HOOPER  
Jennifer Mary BARNES  
Katherine L. JOHNSON  
Jonathan HEFFERNAN

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

(73) Assignee: **Sharp Kabushiki Kaisha, Osaka-shi (JP)**

**MAILING ADDRESS OF SENDER (Please do not use customer number below):**

Harness, Dickey & Pierce, P.L.C.  
P.O. Box 8910  
Reston, VA 20195

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

APR 02 2009



UNITED STATES PATENT AND TRADEMARK OFFICE

DJD/GPB

UNDER SECRETARY OF COMMERCE FOR INTELLECTUAL PROPERTY AND  
DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE

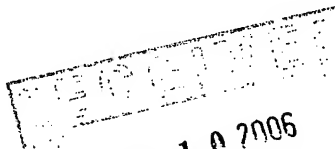
JULY 03, 2006

PTAS

HARNESS, DICKEY & PIERCE, P.L.C.  
P.O. BOX 8910  
RESTON, VA 20195



\*103235223A\*



UNITED STATES PATENT AND TRADEMARK OFFICE  
NOTICE OF RECORDATION OF ASSIGNMENT DOCUMENT

THE ENCLOSED DOCUMENT HAS BEEN RECORDED BY THE ASSIGNMENT DIVISION OF THE U.S. PATENT AND TRADEMARK OFFICE. A COMPLETE MICROFILM COPY IS AVAILABLE AT THE ASSIGNMENT SEARCH ROOM ON THE REEL AND FRAME NUMBER REFERENCED BELOW.

PLEASE REVIEW ALL INFORMATION CONTAINED ON THIS NOTICE. THE INFORMATION CONTAINED ON THIS RECORDATION NOTICE REFLECTS THE DATA PRESENT IN THE PATENT AND TRADEMARK ASSIGNMENT SYSTEM. IF YOU SHOULD FIND ANY ERRORS OR HAVE QUESTIONS CONCERNING THIS NOTICE, YOU MAY CONTACT THE EMPLOYEE WHOSE NAME APPEARS ON THIS NOTICE AT 571-272-3350. PLEASE SEND REQUEST FOR CORRECTION TO: U.S. PATENT AND TRADEMARK OFFICE, MAIL STOP: ASSIGNMENT SERVICES BRANCH, P.O. BOX 1450, ALEXANDRIA, VA 22313.

RECORDATION DATE: 05/05/2006

REEL/FRAME: 017865/0556  
NUMBER OF PAGES: 3

BRIEF: ASSIGNMENT OF ASSIGNOR'S INTEREST (SEE DOCUMENT FOR DETAILS).  
DOCKET NUMBER: 24500-000016/US

ASSIGNOR:

BOUSQUET, VALERIE

DOC DATE: 04/08/2006

ASSIGNOR:

HOOPER, STEWART EDWARD

DOC DATE: 04/08/2006

ASSIGNOR:

BARNES, JENNIFER MARY

DOC DATE: 04/08/2006

ASSIGNOR:

JOHNSON, KATHERINE L.

DOC DATE: 04/08/2006

ASSIGNOR:

HEFFERNAN, JONATHAN

DOC DATE: 04/08/2006

APR 02 2009

ASSIGNEE:

• SHARP KABUSHIKI KAISHA  
22-22 NAGAIKECHO, ABENO-KU  
OSAKA-SHI, OSAKA, JAPAN 545-8522

SERIAL NUMBER: 10525406

FILING DATE:

PATENT NUMBER:

ISSUE DATE:

TITLE: MBE GROWTH OF AN ALGAN LAYER OR ALGAN MULTILAYER STRUCTURE

JOANN STEWART, EXAMINER  
ASSIGNMENT SERVICES BRANCH  
PUBLIC RECORDS DIVISION

APR 02 2009



RECORDATION

05-10-2006



103235223

To the Honorable Com  
Please record the attach

1. Name of conveying party(ies):

- 1) Valerie BOUSQUET
- 2) Stewart Edward HOOPER
- 3) Jennifer Mary BARNES
- 4) Katherine L. JOHNSON
- 5) Jonathan HEFFERNAN

Additional name(s) of conveying party(ies) attached?

☐ YES ☒ NO

3. Nature of conveyance:

- ☒ Assignment ☐ Merger ☐ Security Agreement  
☐ Change of Name ☐ Other:

Execution Date: 1) April 8, 2006 2) April 8, 2006 3) April 8, 2006 4) April 8, 2006 5) April 8, 2006

2. Name and address of receiving party(ies)

Name: **SHARP KABUSHIKI KAISHA**  
Street Address: **22-22 Nagaikecho, Abeno-ku**  
City: **Osaka-shi, Osaka**  
Country: **JAPAN** Postal Code: **545-8522**

Additional name(s) & address(es) attached? ☐ YES ☒ NO

4. Application number(s) or patent number(s):

If this document is being filed together with a new application, the execution date of the application is:

A. Patent Application No(s).

**10/525,406**

B. Patent No.(s).

Additional numbers attached? ☐ YES ☒ NO

5. Name and address of party to whom correspondence concerning document should be mailed:

Name: **HARNESS, DICKEY & PIERCE, P.L.C.**  
Street Address: **P.O. BOX 8910**  
City: **RESTON** State: **VA** ZIP: **20195**  
Country: **USA**

6. Total No. of applications/patents involved: **One (1)**

7. Total fee (37 C.F.R. § 3.41): **\$40.00**

- ☒ Enclosed  
☐ Authorized to be charged to deposit account, if no fee attached.

8. Deposit account number: **08-0750**

(Attach triplicate copy of this page if paying by deposit account)

DO NOT USE THIS SPACE

9. Statement and signature.

*To the best of my knowledge and belief, the foregoing information is true and correct and any attached copy is a true copy of the original document.*

Donald J. Daley/ 34,313  
Name of Person Signing/Reg. No.

*Donald J. Daley* (41,646)  
Signature

May 5, 2006  
Date

Total number of pages including cover sheet, attachments, and document: **Three (3) pages**

05/09/2006 NJANA1 00000173 10525406

01 FC:8021

40.00 EP

DJD/GPB:ame

APR 02 2006